

How I can get a better pour out of my Kegerator?

As the inventor of the Vent Free Seal Forward Faucets I have received over 30 e-mails and phone calls asking this question.

In all cases I have been able to help Home Brew Guys understand the two major parts of their Kegerators system and pour a great beer.

First off, I must tell you that 90% of what you have heard from others about pouring beer from a kegerator and force carbonating your homebrew is not founded in good solid fact. Please remember this; Information passed along from one to another with a little bit of fact may worked for one brew guy. And what works for one may or may not work for the other.

The real key to understanding great beer presentation is to know:

The pouring temperature of the beer you wish to dispense and
The rack-off pressure of that beer at temperature

Rack-off Pressure is defined as: The closed container pressure of the beer at its serving temperature before it's tapped.

(More about this later)

Because the complexity of pouring a carbonated liquid like beer as compared to pouring water, no one has really given much thought to the difference and explained to the Homebrew Guys its importance in how a beer is poured. Sorry to say; most of us are flying by the seat of our pants and have to go through a number of batches to get the right combination of hops and carbonation in order to pour with our Kegerators. We go out to the internet and ask and get back all manners of what to do. Many times we think we have done the batch wrong, because when we hook up to our kegerator we pour a lot of foam. Just to find out we have to reduce our % volume to get it to pour.

Will I'm here to tell you the culprit is not you or your beer. It's the pouring half of our kegerator. It's the inline restriction (back-pressure set up) that we know very little about and depend on the maker to have right. We pretty much take for granted that the pre-made Kegerators or KR-Kits are correctly built and should pour great beer, all we do is hook them up and pour.

Kegerators for the most part are designed to pour water not beer. I will get into that but first I would like to review the real keys numbers to understanding great beer presentation:

1. The pouring temperature of the beer you wish to dispense and
2. The rack off pressure of that beer at that temperature

If you **do not know** what these two major numbers are before you ever hook up your beer for dispense you must read on.

If you **do know** what these two numbers are you **must** read on.

The closed container pressure at temperature defines and sets the regulator (or secondary regulator) pressure for each keg of beer you wish to pour. Please review the chart:

		Volume of CO2 desired														
		%V														
(V)		1	1.8	2	2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8	2.9	3	3.1	3.2
Temp (F)		(Psi.)														
30		0.8	2.7	3.6	4.5	5.4	6.3	7.2	8.1	9.0	10.0	10.9	11.8	12.7	13.6	
31		1.2	3.1	4.0	4.9	5.9	6.8	7.7	8.6	9.6	10.5	11.4	12.3	13.3	14.2	
32		1.6	3.5	4.4	5.4	6.3	7.3	8.2	9.2	10.1	11.0	12.0	12.9	13.9	14.8	
33		1.9	3.9	4.9	5.8	6.8	7.8	8.7	9.7	10.6	11.6	12.6	13.5	14.5	15.4	
34		2.3	4.3	5.3	6.3	7.3	8.2	9.2	10.2	11.2	12.1	13.1	14.1	15.1	16.0	
35		2.7	4.7	5.7	6.7	7.7	8.7	9.7	10.7	11.7	12.7	13.7	14.7	15.7	16.7	
36		3.1	5.1	6.2	7.2	8.2	9.2	10.2	11.2	12.3	13.3	14.3	15.3	16.3	17.3	
37		3.5	5.6	6.6	7.6	8.7	9.7	10.7	11.8	12.8	13.8	14.9	15.9	16.9	17.9	
38		3.9	6.0	7.0	8.1	9.1	10.2	11.2	12.3	13.3	14.4	15.4	16.5	17.5	18.6	
39		4.3	6.4	7.5	8.6	9.6	10.7	11.8	12.8	13.9	15.0	16.0	17.1	18.1	19.2	
40		4.7	6.8	7.9	9.0	10.1	11.2	12.3	13.4	14.4	15.5	16.6	17.7	18.8	19.8	
41		5.1	7.3	8.4	9.5	10.6	11.7	12.8	13.9	15.0	16.1	17.2	18.3	19.4	20.5	
42		5.5	7.7	8.8	10.0	11.1	12.2	13.3	14.4	15.5	16.7	17.8	18.9	20.0	21.1	
43		5.9	8.1	9.3	10.4	11.6	12.7	13.8	15.0	16.1	17.2	18.4	19.5	20.6	21.7	
44		6.3	8.6	9.7	10.9	12.1	13.2	14.4	15.5	16.7	17.8	19.0	20.1	21.3	22.4	
45		6.7	9.0	10.2	11.4	12.5	13.7	14.9	16.1	17.2	18.4	19.6	20.7	21.9	23.0	
46		7.1	9.5	10.7	11.8	13.0	14.2	15.4	16.6	17.8	19.0	20.2	21.3	22.5	23.7	
47		7.5	9.9	11.1	12.3	13.5	14.7	15.9	17.2	18.4	19.6	20.8	22.0	23.2	24.3	
48		7.9	10.4	11.6	12.8	14.0	15.3	16.5	17.7	18.9	20.1	21.4	22.6	23.8	25.0	
49		8.3	10.8	12.0	13.3	14.5	15.8	17.0	18.3	19.5	20.7	22.0	23.2	24.4	25.7	
50		8.7	11.3	12.5	13.8	15.0	16.3	17.6	18.8	20.1	21.3	22.6	23.8	25.1	26.3	
52		9.6	12.2	13.5	14.8	16.1	17.3	18.6	19.9	21.2	22.5	23.8	25.1	26.4	27.6	
54		10.4	13.1	14.4	15.7	17.1	18.4	19.7	21.1	22.4	23.7	25.0	26.3	27.7	29.0	
56	0.3	11.3	14.0	15.4	16.7	18.1	19.5	20.8	22.2	23.6	24.9	26.3	27.6	29.0	30.3	
58	0.9	12.1	15.0	16.4	17.8	19.2	20.6	21.9	23.3	24.7	26.1	27.5	28.9	30.3	31.7	
60	1.5	13.0	15.9	17.3	18.8	20.2	21.6	23.1	24.5	25.9	27.4	28.8	30.2	31.6	33.0	

The temperature (Temp (F)) of the beer found at the far left column is read across its row to the pressure found within the beer container before tapped. This pressure is the dispense pressure at temperature need to maintain the internal head pressure of your beer and keep it pristine. Your regulator is set to this pressure (and **not** changed) to dispense beer. Your dispensing system is not dispensing water so do not change the regulator to change your beer flow. Your regulator is not pressurizing a water spigot. It's there to maintain Co2/V.

The Co2/V can be found by simply following the column up to the Top (%V) number. 38 F at 10.2 psi is a 2.4 solubility or (2.4 % V) Changing the dispense pressure or regulator pressure will change the % /V of your beer over time (about 48hrs). Changing dispensing pressure or regulator pressure will instantly change the flow rate of the beer and so the back-pressure that the system operates. Mixed gas is a way of adding back-pressure to a fixed system with out adding Co2. If anything it will take Co2 away from your beer over time for a number of reasons which I will not get into at this time. If you have the correct back-pressure built inline you do not need mixed gas.

Why you do not use the regulator to control the beer flow.

It's best explained this way: Beer is a closed container liquid that has been brought to a given temperature and held under a given gas pressure (Co2) for a given amount of time. This temp, pressure and time allow the gas to dissolve into the liquid as a balanced solution. Once the desired % /V is achieved, the pressure is removed and the closed container is allowed to rest at temperature. This rest allows the internal pressure between gas and liquid to normalize or balance.

This normalized pressure within the container is the key to maintaining the integrity of the Brew and for the setting the regulator. Once you set the regulator you will **not** change it. Change the regulator and over time (not right away) you alter the beers Co2. Change the regulator and you will instantly change the driving force over the liquid and it will increase the speed of flow in the fixed dispense line, which in turn will artificially increase the fixed-line back-pressure. A band aide for a poor dispense system (I call it mix gas aide)

Now I'm sure most of you have all heard the best way to clear a foaming line is increase the regulator pressure, right?

Wrong! This is an old trick that is used by people to cover a bad back-pressure problem at the commercial level where beer is used up very fast and it has no time to over carbonate.

Homebrew guys will get the perception of a better beer presentation and in some cases a little tighter foam head until the Co2 saturation over time over powers the back-pressure of their dispense system and all they get is foam. Regulators are not water spigots. Once the beer has taken on more Co2 it is much more sensitive to fill speed entrainment (foaming) and a wild beer.

Again there is an old trick to degasify an over carbonated container of beer at the commercial level. Just bounce the keg on the floor and pull the safety ring on the coupler and let all the gas out. The beer is now flat and bitter so who cares it pours good and will sell out in a few days. It's the poor dispense systems not the beer.

The time it should take to fill a glass of beer (oz per-min.) is defined by the beer Co2 number not some made up gal per min. The only beer that pours well at a gal per min. is a British Ale.

You see the higher the Co2 by Volume the slower your beer should fill the glass in time (oz / min.)

When the beer is filling too fast we have to slough-off or pour-off the head as it builds up in the glass so we get a good pour with about 3/4in head.

Now this may look good but if you think about it, all that foam that was poured-off took a lot of the natural carbonation with it out of the beer and broke out more bitters than normal. It's like taking an open can of coke, covering the opening, shaking it up a little, letting off a small amount of Co2 and then drinking it. Shake it a lot and it's sweet and flat

Do not get caught up in the old gal per min. fill rate. It's a sales gimmick. One gal per min. is counter productive to good beer presentation.

I'll give you a little table to help get a more correct flow rate based on the beer's Co2 number:

FLOW RATE TABLE BEER STYLE %V	Flow Rate (oz/min), (gpm)
Wheat Beers:..... 3.0 - up	80 --- 0.62
American Lagers and Ale:.... 2.5 - 2.9	100 --- 0.78
German Lager..... 2.3 - 2.5	115 --- 0.90
British Ale..... 1.8 - 2.2	128 --- 1.00
	192 --- 1.50
	230 --- 1.80
	256 --- 2.00

To get these flow rates you do not change the regulator. You have to change the back-pressure in the dispense line.

I have a chart that will give you the back-pressure of a fixed 10 ft. beer line by its given I.D.

Pressure drop (psi) per 10 ft Vinyl Tubing
Approximate absolute roughness for vinyl I.D.= .00096 in/in

Flow Rate (oz/min), (gpm)	Tube I.D. 3/16" (.1875)	Tube I.D. 1/4" (.250)	Tube I.D. 5/16" (.3125)	Tube I.D. 3/8" (.375)	Tube I.D. 1/2" (.500)
80 --- 0.62	9.4	2.3	0.77	0.32	0.06
100 --- 0.78	14.0	3.4	1.14	0.47	0.12
115 --- 0.90	18.1	4.4	1.46	0.60	0.15
128 --- 1.00	21.9	5.3	1.77	0.73	0.18
192 --- 1.50	47.0	11.1	3.66	1.50	0.37
230 --- 1.80	-	15.4	5.07	2.07	0.51
256 --- 2.00	-	18.8	6.17	3.51	0.62
liquid oz./ ft.	1/5	1/3	1/2	3/4	1 1/3

If you review this chart you will note that the back-pressure is changing as flow rate changes but the line is a fixed length (10ft) and I.D. (internal dimension). As you see, the back-pressure is reducing as the flow rate becomes less and less and you come to understand that a high Co2 beer like a Wheat Beers (3.0 volumes & up) must have a much longer beer line than a British Ale (1.8 to 2.2 volumes).

If you use the charts you will see that a wheat beer held at a cooler temperature of 40 F and a Co2 volume of 3.0 will have a balance pressure of 17.7 (let us say 18psi) and we should pour it slowly at around 80 oz /min. We would have to put a minimum back-pressure of 18psi inline or about 20ft of 3/16 I.D. line in our kegerator. A good set-up rule is applied pressure +5lbs. You can always trim back for best presentation.

As you can see, Kegerators with just 4 or 5 feet of 3/16 I.D. do not have sufficient back-pressure - by design. You have to be over driven the keg with excessive pressure to get back-pressure up to clear stream, which means you up the regulator and over time you will end up wild beer syndrome.

The subject of proper dispense is not easy to get all at once, for there are a number of other factors that must be take in consideration when pouring your beer.

Why is my faucet stream wavering?

Waver of the beer stream as it comes out of the faucet is some times subjective.

Is it perception or is there a need to have a little faster fill speed. Do not confuse this with flow rate. Fill speed is how fast the beer stream is moving as it pours out of the faucet. Fill rate (see table above) is oz /min. or volumetric flow rate. The more consolidated the stream the faster it will enter into the beer glass and the rounder it will look. The appearance of the beer stream can be just an observation or perception based on long time exposure or experiences pouring with old restriction faucets. Older faucets are somewhat restricted to improve consolidation because of poor system installation. It is fixed in the faucet and can not be changed. This can cause a foaming problem in some styles of beer.

It is for this reason the Ultra-Flo Faucet has 5 spout I.D. dimensions to choose from so it can be tuned to the style of beer being poured. To improve consolidation you just change the Faucet Spout I.D. As you change the spout I.D smaller the speed of fill increases. A low Co2 beer likes a little more entrainment speed so as to break out the carbonation. If you pour low Co2 beer like Ale, a 10mm I.D. or 11.5mm spouts is good. If you are pouring a high Co2 Wheat beer less entrainment speed is good and a Spout of 12mm or 12.5mm.is used. Most beers will use a standard 11.75mm Spout

Waver is mostly perception but at times a good indicator to consolidate and change to a small I.D. spout

At the end of the day it takes a long time to become familiar with all of the in and out's of beer dispensing and a much longer beer line in your kegerator to pour better beer than you have room for.

That is why I invented and patented the Flo-Gate and Ultra-Flo VM 2000 and why the major manufactures of beer dispensing equipment use my patents in there designs. The Flo-Gate takes the guess work out of back-pressure problems in just 3 inch's not 20ft.and the Ultra-Flo gives you control of your pour.

But Remember Only Ultraflow Dispense International Has It All.

Give me a call at 414-217-8416 I can help

Kind regards,

Brad Amidzich